



Anticipating, Managing and Preventing Corrosion NASA Perspective

Rick Russell

NASA Kennedy Space Center

Aircraft Airworthiness and Sustainment Conference

April 15, 2014

Baltimore, MD

NASA Perspective



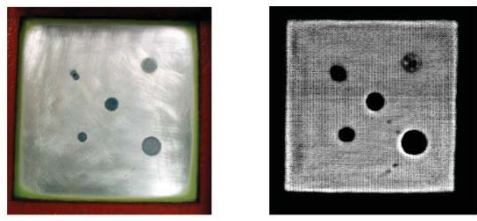
- Anticipating
 - New Smart Coatings
 - Test Methods
 - NDE Development
- Managing
 - KSC Facilities
 - Spacecraft
- Preventing
 - Accelerated testing
 - Advanced Coatings and CPCs
 - Lessons Learned from Shuttle Program



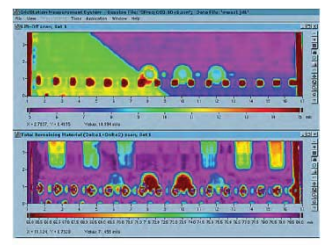
Anticipating



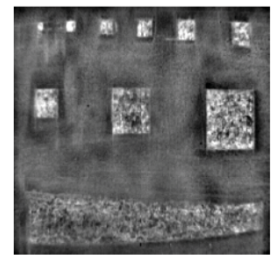
Smart Coatings



Terahertz



Eddy Current



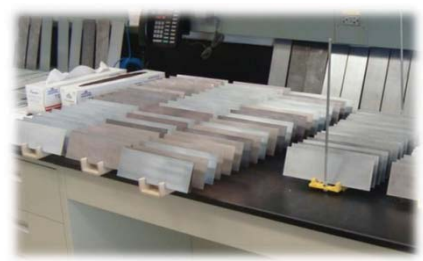
**Thermography
Advanced NDE**



Beach site Testing



Electrochemical



Salt Fog

Laboratory Testing

Managing



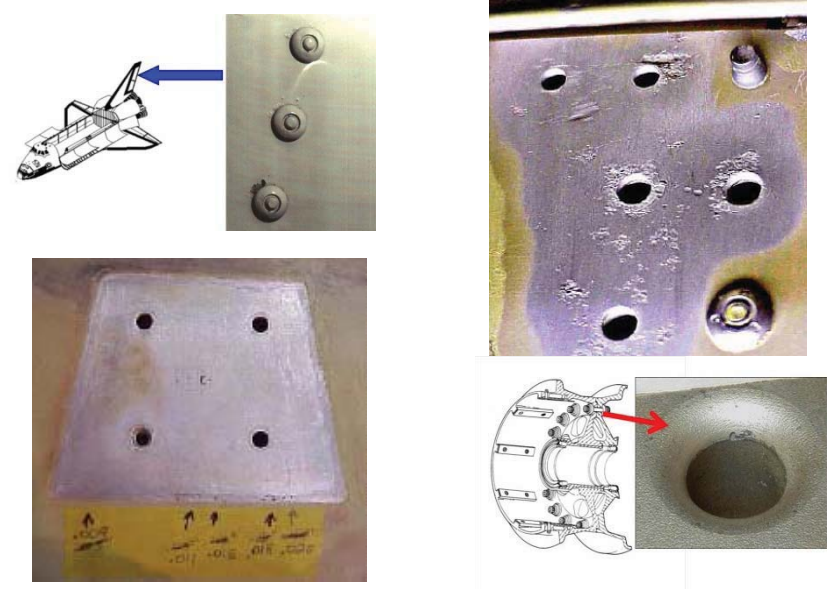
Flight Programs



- Zone 1:
pH ~ 0-1
- Zone 2:
pH ~ 2-3
- Zone 3:
pH ~ 2-3



Environmentally Preferable Coatings for Launch Structures



Prevention



- Development efforts
 - Smart Coatings
 - Non-Chrome Systems Testing
 - Hex Chrome Free Coatings for Electronics
 - Alternates to Nitric Acid Passivation
 - Environmentally Preferable Coatings for Launch Structures
 - Environmentally friendly coatings and CPCs

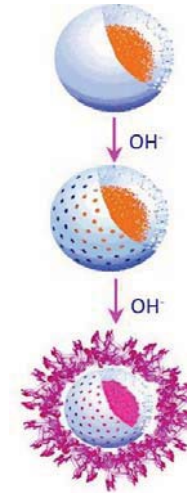


Image: Master isolated images / FreeDigitalPhotos.net

vs



- Replacement for chromated primers with comparable corrosion protection performance
 - Adequate offgassing (toxicity) / outgassing (external contamination) performance
- Replacement for chromated chemical conversion coatings
- Faying surface sealants or treatments and methods that allow for both corrosion protection and electrical bonding
 - Avoid galvanic couples
 - Adequate offgassing (toxicity) / outgassing (external contamination) performance
- Hydrophobic coatings for corrosion protection, faying surfaces, electrical bonding
 - Aerospace nano-silicon particles for hydrophobic properties
 - Long term toxicity not well understood

